

Notice of Allowability

Application No.

10/827,001

Examiner

Ling-Siu Choi

Applicant(s)

KWAG ET AL.

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Amendment filed 01/11/2007.
2. ☒ The allowed claim(s) is/are 3-32.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DETAILED ACTION

1. This Office Action is in response to the Response filed January 11, 2007. Claims 1-2 were canceled and Claims 3-34 are now pending.

Examiner's Amendment

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CAR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Cary Kappel on March 19, 2007.

3. The application has been amended as follows:
Cancel claims 33-34 without prejudice.

Allowable Subject Matter

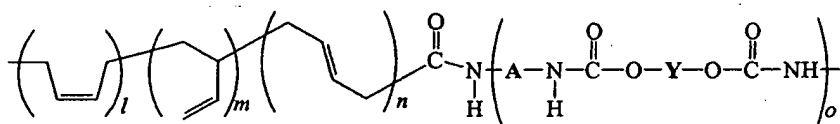
4. Claims 3-32 are allowed.
5. The following is an examiner's statement of reasons for allowance:

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The present claims are allowable over the closest references: Baack et al. (US 4,242,468 \cong GB 2 028 356 A) and Kaufhold et al. (US 6,552,153 B1).

Summary of Claim 3:

A method to prepare a high 1,4-cis polybutadiene-polyurethane copolymer represented by the following formula 1:



wherein $l = 94-99\%$; $m = 0-5\%$; $n = 0-5\%$; $o = 1-100\%$; $l+m+n = 100\%$; $l/(m+n) = 15-100$; and A and Y = C1-20 alkyl or aryl

the method comprising

A	polymerizing 1,3-butadiene or butadiene derivatives with a		
	catalyst	a rare earth compound	in the presence of a non-polar solvent
		a halogen-containing compound	
		an organoaluminum compound	
	to prepare polybutadiene having a high 1,4-cis content $\geq 95\%$ <u>except monohydroxy-terminated polybutadiene*</u>		
B	adding	an isocyanate compound having at least two functional groups	
		an alcohol compound having at least two functional groups	
	with or without base or tin catalyst to the result of the step A		

*The amendment is supported in the Specification: "Conventionally, low 1,4-cis polybutadiene-polyurethane is synthesized by the three steps using an anionic catalyst; 1) butadiene polymerization, 2) preparation of hydroxyl-terminal polybutadiene with an epoxy compound, 3) polybutadiene-polyurethane copolymerization with an isocyanate compound" (page 4, lines 17-20).

Baack et al. disclose a process to prepare a polyurethane by reacting at least one polyisocyanate with at least one polyol under polyurethane-forming conditions,

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which may include the presence of a catalyst, in the presence of a monohydroxy-terminated polybutadiene which has a molecular weight of 500 to 100,000, wherein the use of a polybutadiene diol as polyol is excluded (abstract; claim 1). Baack et al. further disclose that the polyisocyanate can be polymethylenepolyphenylene polyisocyanate; the diol can be ethylene glycol; the catalyst can be amine or organo-metallic compound such as dibutyl tin dilaurate (col. 2, lines 19-26; 31-40, and 66). However, Baack et al. do not teach or fairly suggest the claimed process to prepare the high 1,4-cis polybutadiene-polyurethane copolymer without using monohydroxy-terminated polybutadiene.

Kaufhold et al. disclose a thermoplastic polyurethane prepared by reacting (A) an organic diisocyanate; (B) at least one linear hydroxyl-terminating polyol selected from the group consisting of polyester diols, polyether diols, and polycarbonate diol; (C) a chain extender selected from diamine, diols, diester of terephthalic acid with glycol, hydroxyalkylene ether of hydroquinone, or ethoxylated bisphenol, and (D) a mixture of hydroxy-terminating hydrogenated polybutadiene: $\text{HO-CH}_2\text{-CH}_2\text{-}[(\text{CH}_2\text{-CH}_2)_m\text{-}\{\text{CH}_2\text{-CH}(\text{CH}_2\text{-CH}_3)\}_n]\text{-CH}_2\text{-CH}_2\text{-OH}$ and $\text{CH}_3\text{-CH}_2\text{-}[(\text{CH}_2\text{-CH}_2)_p\text{-}\{\text{CH}_2\text{-CH}(\text{CH}_2\text{-CH}_3)\}_q]\text{-CH}_2\text{-CH}_2\text{-OH}$ in the presence of an amine or an organic metal (tin) compound as a catalyst (col. 5, lines 7-19; claim 1). However, Kaufhold et al. do not teach or fairly suggest the claimed process to prepare the 1,4-cis polybutadiene-polyurethane copolymer without using monohydroxy-terminated polybutadiene.

In light of the above discussion, it is evident as to why the present claims are patentable over the prior art.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling-Siu Choi whose telephone number is 571-272-1098.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on 571-272-1114.


LING-SUI CHOI
PRIMARY EXAMINER

March 20, 2007